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मानक

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“Step Out From the Old to the New”

IS 1004 (1980): Valve Grinding Compound [PGD 9: Abrasives]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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*Indian Standard*

**SPECIFICATION FOR  
VALVE GRINDING COMPOUND**

*( First Revision )*

**1. Scope** — Covers the requirements of valve grinding compound, consisting essentially of abrasive grains suspended in a fluid vehicle ( grease ) used for grinding internal combustion engine valves, etc.

**1.1** This standard does not cover the requirements of lapping of components.

**2. Grades** — Shall be of the following three grades:

- a) Coarse,
- b) Medium, and
- c) Fine.

**3. Material**

**3.1 Abrasive**

**3.1.1** The abrasive materials used in the manufacture of the compound shall be silicon carbide abrasive containing at least 90 percent of silicon carbide by mass.

**3.1.2** The range of sizes of the abrasive grain used in the three grades of valve grinding compound shall be as under:

<i>Grade</i>	<i>Grit Size of the Abrasive Grain</i>
Coarse	120-150
Medium	180-220
Fine	240 and above

**3.1.2.1** The allowable limits for the sizing of the abrasive grains shall be as given in Table 1.

**TABLE 1 LIMITS FOR SIZING OF ABRASIVE GRAINS**

Grit Size	IS Sieve Through Which 100 Percent Shall Pass	Control Sieve			Passing Through Control Sieve and Retained on		Cumulative Minimum Through Control Sieve and Retained		Maximum of Three Per- cent Through IS Sieve Designa- tion
		IS Sieve Designa- tion	Opening mm	Oversize, on Percent Max	IS Sieve Designa- tion	Per- cent Max	On IS Sieve Designation	Per- cent	
( 1 )	( 2 )	( 3 )	( 4 )	( 5 )	( 6 )	( 7 )	( 8 )	( 9 )	( 10 )
120	15	12	0.124	15	10	30	10 and 9	60	6
150	15	10	0.104	15	9 and 8	40	9, 8 and 6	75	5
180	12	9	0.089	15	8 and 6	40	8, 6 and 5	65	—
220	10	8	0.075	15	6 and 5	40	6, 5 and 4	60	—
240	9	8	0.075	5	6 and 5	8	6, 5 and 4	38	—

**Note** — For details of IS Sieve see IS : 460 ( Part I to Part III ) - 1978 ' Test sieves ' ( second revision ).

Adopted 30 September 1980

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## IS : 1004-1980

### 3.2 Vehicle

**3.2.1** The vehicle used shall be grease, either soda-based or lime-based or oil having the following characteristics:

- a) under normal conditions of use it shall not allow the abrasive to produce deep surface marks,
- b) shall ensure cool cutting,
- c) shall be sufficiently viscous to hold the abrasive grains in suspension under the operating conditions,
- d) shall be able to disperse the abrasive grains uniformly,
- e) shall not be appreciably affected by changes in temperature, and
- f) shall not require any inflammable substance for cleaning it from the work piece.

**3.2.2** In addition to the characteristics mentioned in 3.2.1, the vehicle used shall comply with the following requirements:

a) Drop point, minimum (for grease) shall be 50° C and shall be determined according to the method given in IS : 1448 [ P : 52 ]-1971 ' Methods of test for petroleum and its products: P 52 Drop point; and

b) pH value, maximum, shall be 7 and shall be determined according to the method given in IS : 5741-1970 ' Methods for determination of pH '.

**4. Composition of Compound** — The compound shall have the following composition:

Abrasive, <i>Min</i>	30 percent by weight
Vehicle	Remainder

**5. Chemical Analysis** — The silicon carbide content in value grinding compound shall be determined as described in Appendix A.

### 6. Designation

**6.1** Valve grinding compound having silicon carbide abrasive, of fine grade and conforming to this standard, shall be designated as:

Valve Grinding Compound, Fine, IS : 1004

**7. Packing** — The compound shall be packed in suitable containers.

**8. Marking** — Containers containing the compound shall be marked with the following:

- a) Grade,
- b) Weight of content, and
- c) Manufacturer's name or trade-mark.

**8.1 ISI Certification Marking** — Details available with the Indian Standards Institution.

## APPENDIX A

( Clause 5 )

### DETERMINATION OF SILICON CARBIDE CONTENT IN VALVE GRINDING COMPOUND

#### A-1. Method

**A-1.1** Take five grams of the valve grinding compound and dissolve it in carbon tetrachloride or trichloro-ethylene or any other suitable solvent. After degreasing the valve grinding completely dry the abrasive material at 110° C for one hour and weigh again.

*Calculation*

Percentage of abrasive  
material in valve  
grinding compound

$$\frac{\text{Mass of degreased and dry abrasive material} \times 100}{\text{Mass of valve grinding compound (5g)}}$$

**A-1.2** Take the degreased and dry abrasive material and crush it in an agate paste mortar to pass through 150 mesh sieve. Take one gram of this sieved sample (  $W_2$  ) in a 30 ml platinum crucible and add 15 to 20 ml of hydrofluoric acid and three to four drops of sulphuric acid (  $H_2SO_4$  ) and evaporate slowly on a sand bath to volatilize the free silica and silica combined as silicates. Evaporate excess of sulphur trioxide (  $SO_3$  ) fumes and fuse with approximately 10 grams of potassium bisulphate (  $KHSO_4$  ) at red heat, cool, extract the melt with 75 ml of hot water and 20 ml of hydrochloric acid (  $HCl$  ), and wash the silicon carbide residue with hot water acidulated with hydrochloric acid. Burn off the filter paper and ignite the silicon carbide residue at  $800^\circ C$ , weigh the silicon carbide (  $W_1$  ),

Combine the extracted liquid and the above filtrate obtained after washing silicon carbide. Add 5 ml of sulphuric acid and evaporate on a sand bath until fumes of  $SO_3$  appear. Cool, dilute with hot water, filter and wash with hot water acidulated with hydrochloric acid. Burn off the filter paper and ignite to a constant weight. The silica is volatilized according to the above procedure (  $W_3$  ),

*Calculation*

$$\text{Percentage of silicon carbide} = \frac{W_1 \times 100}{W_2} + \frac{W_3 \times 0.666 \times 100}{W_2}$$

where

$W_1$  = weight of residue in platinum crucible,

$W_2$  = weight of sample taken, and

$W_3$  = weight of silica in the filtrate.

## EXPLANATORY NOTE

This standard was first published in 1956. The committee responsible for its preparation, reviewed and decided to revise it. In this revision, the following have been incorporated:

- a) Method of chemical analysis of the abrasive ( silicon carbide ),
- b) Modified vehicle characteristics, and
- c) Title changed from ' valve grinding paste ' to ' valve grinding compound '.

Regarding the method of determination of silicon carbide contents in valve grinding compound, considerable assistance has been derived from Annual Book of ASTM Standards 1979 : Part 17 — Refractories, Glass, Ceramic Materials ; Carbon and Graphite Product ( page 485 — 486 ).

**AMENDMENT NO. 1   APRIL 2003**  
**TO**  
**IS 1004 : 1980   SPECIFICATION FOR VALVE**  
**GRINDING COMPOUND**

*( First Revision )*

( *Page 3, clause A-1.2, para 2, last line* ) — Substitute 'The silica is volatilized according to the above procedure. The silicon thus obtained is weighed ( $W_3$ ).' for 'The silica is volatilized according to the above procedure ( $W_3$ ).'

( BP 09 )

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